



**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Lloyd W. Marsden      Examiner: Cheung, William K  
Serial No.: 10/826,122      Group Art Number: 1713  
Filed: April 15, 2004      Docket No.: 76721.011600  
Confirmation No. 9871  
Title: Polymeric Stabilization Composition and Method

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CERTIFICATE UNDER 37 CFR 1.10  
'Express Mail' mailing label number: EV780364071US  
Date of Deposit: October 14, 2005

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office To Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents P.O. Box 1450, Alexandria, VA 22313-1450.

By: Sylvia A. Cei  
Name: Sylvia A. Cei

**DECLARATION UNDER 37 C.F.R. § 1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

I, Lloyd W. Marsden, P.E., do hereby state and declare as follows:

1. I am the inventor in the above-identified application.
2. I graduated in 1972 from the South Dakota School of Mines and Technology and received a Bachelor of Science degree in the field Mechanical Engineering. Following graduation I studied for 1 year in the field of Structural Engineering.
3. I have been working in the field of polymers since 1981. I have spent the 22 years principally in research and development of guar gum in industrial applications. I am currently General Manager at Rantec Corporation.

4. I am a licensed Professional Engineer in the states of Wyoming (Registration Number 4088 ) and South Dakota (Registration Number 3018).
5. I am familiar with the above-identified application, U.S. Patent No. 5,459,181 to West et al. (West) and Ainley et al. (SPE 25463: A comparison of Delay Methodology, Production Operations Symposium, Oklahoma City, OK, March 21023, 1993. pp 517-520, hereinafter “Ainley”).and have read the Office Action of July 14, 2005 (Action).
6. I am familiar with the testing of viscosity using different instruments including viscometers and rheometers and I have at least once attempted to correlate viscosity measurements obtained between the two instruments. Attached as Attachment A are the results of tests performed in January and March of 1984 to compare the measurements made by a Brookfield RVT viscometer at 20 rpm and a Baroid rheometer at 100 rpm on a sample of polymer. The results of these tests are presented in a spreadsheet and a graph along with a copy of the actual laboratory notebook pages. The graph clearly shows that there is no linear correlation between the viscosity obtained by a rheometer and the viscosity measured by a viscometer.
7. I respectfully submit that obtaining a particular polymer/crosslinker concentration in an aqueous mixture with such a low viscosity that, when applied, still results in a substantially insoluble crosslinked polymer coating on the surface requires experimentation that does not qualify as routine experimentation for a person skilled in the art. For example, over 197 experimental tests were performed over the course of more than 12 months to create a low viscosity but high polymer concentration aqueous mixture that could be easily applied via a hydroseeder yet still produced a strong, crosslinked polymer film that was substantially insoluble.
8. I respectfully submit that West when practiced does not result in an aqueous mixture as now claimed in the amended claims pending before the USPTO in this application.
9. West describes a dry blend of polymer, crosslinker and catalyst that is mixed into water in a single step, so that all of the components of the dry blend are added at once. My

experiments in the field and in the lab, see Attachment B containing various records of laboratory experiments done over a period of time, indicate that 15 minutes after mixing a dry blend meeting West's specification in a single step, the viscosity is substantially higher than using the inventive two-step mixing technique disclosed in the application.

10. The experiments in Attachment B show a comparison test using West's disclosed composition of polymer and crosslinker. In the experiment we used Rantec J3000, which is a unmodified natural guar gum, and an otherwise similar depolymerized guar gum sold under the Rantec trademark GUARDIAN. The results of this experiment showed the claimed invention created a low viscosity aqueous solution of polymer that could not be reproduced by practicing West. The results also showed that the polymer film resulting when the claimed aqueous material dried was substantially insoluble and suitable for binding use in a natural environment.
11. I further submit that the properties of the aqueous mixture created by the inventive method were unexpected and differ to such an extent that the claimed aqueous mixture is a marked improvement over the disclosure of West in its ease of application and its reduction in the amount of water necessary to achieve the same density of polymer coating on a surface.
12. For all of the above reasons I respectfully submit to the Examiner that neither West nor Ainley disclose a composition or method that result in the claimed compositions. One skilled in the art would not find our claimed invention obvious and would not even consider making our invention solely because of reading West, and would know that any variation in mixing method that is not specifically disclosed in the art would have any effect on viscosity of aqueous polymer mixtures.
13. I declare further that all statements made herein of my own knowledge are true; that all statements made herein on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the

United States Code and that such willful false statements may jeopardize the validity of this application or any patents issuing thereon

Executed this 14th day of October, 2005, at Ranchester, Wyoming, USA.

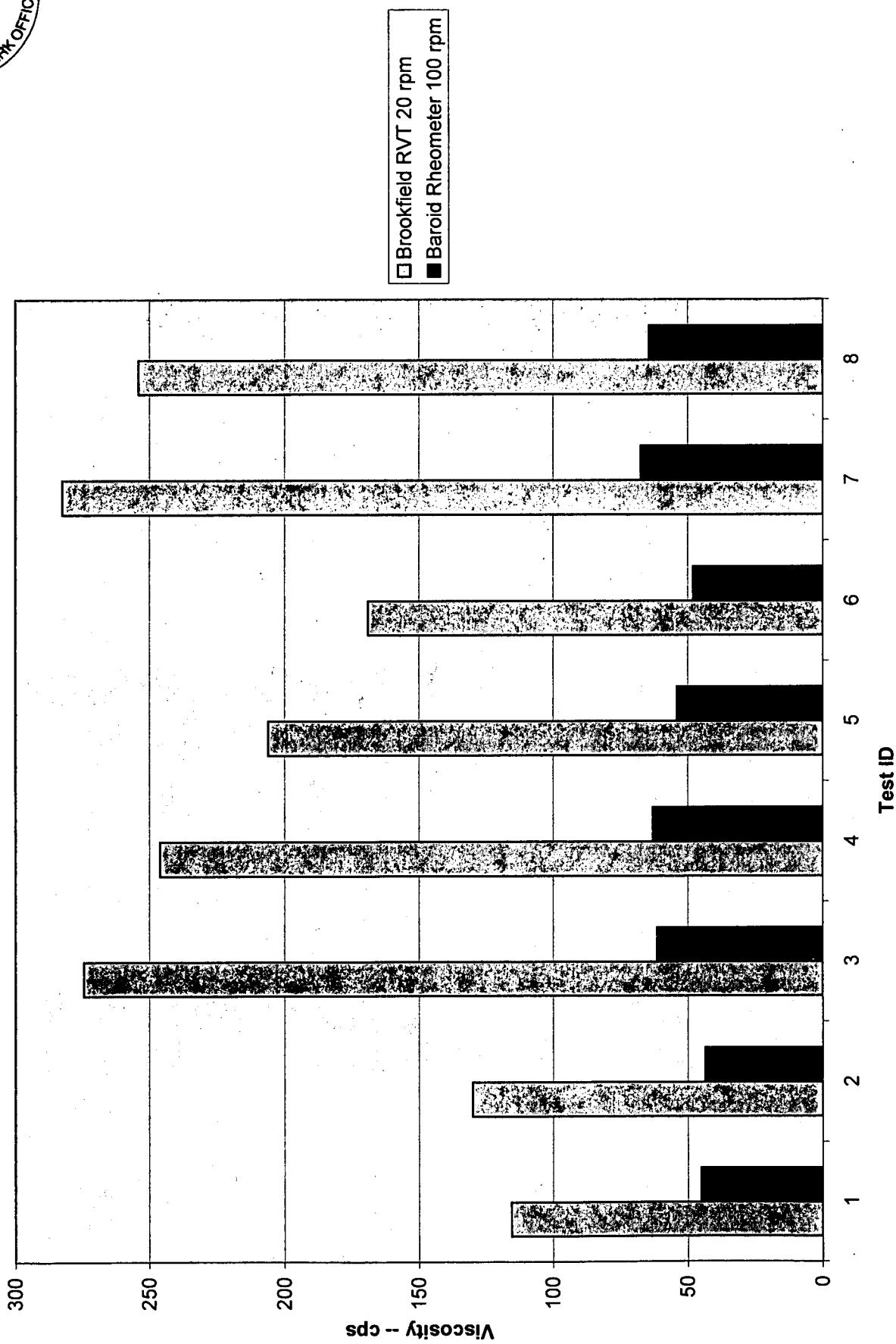


Lloyd W. Marsden, P.E.

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## **ATTACHMENT “A”**

Comparison of Viscosity Measurements from an RVT Viscometer and a Rheometer



Rantec Corporation

12-Oct-05

Product WGA-1 Guar based fracturing gel

Lot No.	Date	Hydration Viscosity -- cps		Baroid Rheometer 100 rpm	Ratio
		Time	Brookfield RVT 20 rpm		
A243	3-Jan-84 5 min		115.5	45	0.3896
A243	3-Jan-84 5 min		130	43.5	0.3346
A243	3-Jan-84 1 hr		274.5	61.5	0.2240
A244	3-Jan-84 2 hr		246	63	0.2561
A261	14-Jan-84 5 min		206	54	0.2621
A261	14-Jan-84 5 min		169	48	0.2840
A261	14-Jan-84 1 hr		282.5	67.5	0.2389
A261	14-Jan-84 1 hr		254	64.5	0.2539

## VISCOOSITY TEST REPORT

DATE: 3/14/84 FORM: WCAI A26

TEST INFORMATION: BY: TS

$$48\% = 2.4g/500ml$$

SAMPLE	MODEL	SPINDLE	R.P.M.	DIAL READING	FACTOR	VISCOOSITY CPS.	TEMP. °C	TIME	354	NOTES	356
Brkfd	1	12	41.2	33.8	5	206.0	169.0	5'	359		40.1
			60.9	55.9		304.5	279.5	15'	409		411
			63.4	59.2		317.0	296.0	30'	424		426
			56.5	50.8		282.5	254.0	1h	454		456
			45.6	39.7		228.0	198.5	2h	654		556
			3.6	-		-	-	4h			
			3.6	-		-	-	24h			
Nil	300	285	27.5	1	28.5	27.5	5'				
Baroid	100	18.0	16.0	3	54.0	48.0					
	300	33.5	32.5	1	33.5	32.5	15'				
	100	21.0	20.5	3	63.0	61.5					
	300	35.5	35.0	1	35.5	35.0	30'				
	100	22.5	21.5	3	67.5	64.5					
	600	47.5	46.5	.5	23.75	23.25	1h				
	300	36.0	35.0	1	36.0	35.0					
	100	22.5	21.5	3	67.5	64.5					
	300	35.0	34.0	1	35.0	34.0	2h				
	100	21.5	21.0	3	64.5	63.0					
	300	15.0	-	1	-	-	4h				
	100	15.0	-	3	-	-					
	300	15.0	-	1	15.0	-					
	100	15.0	-	3	-	-					

CONCLUSIONS:

## VISCOSEITY TEST REPORT

FOR

WGA1

BY

TS

DATE: 1/3/84

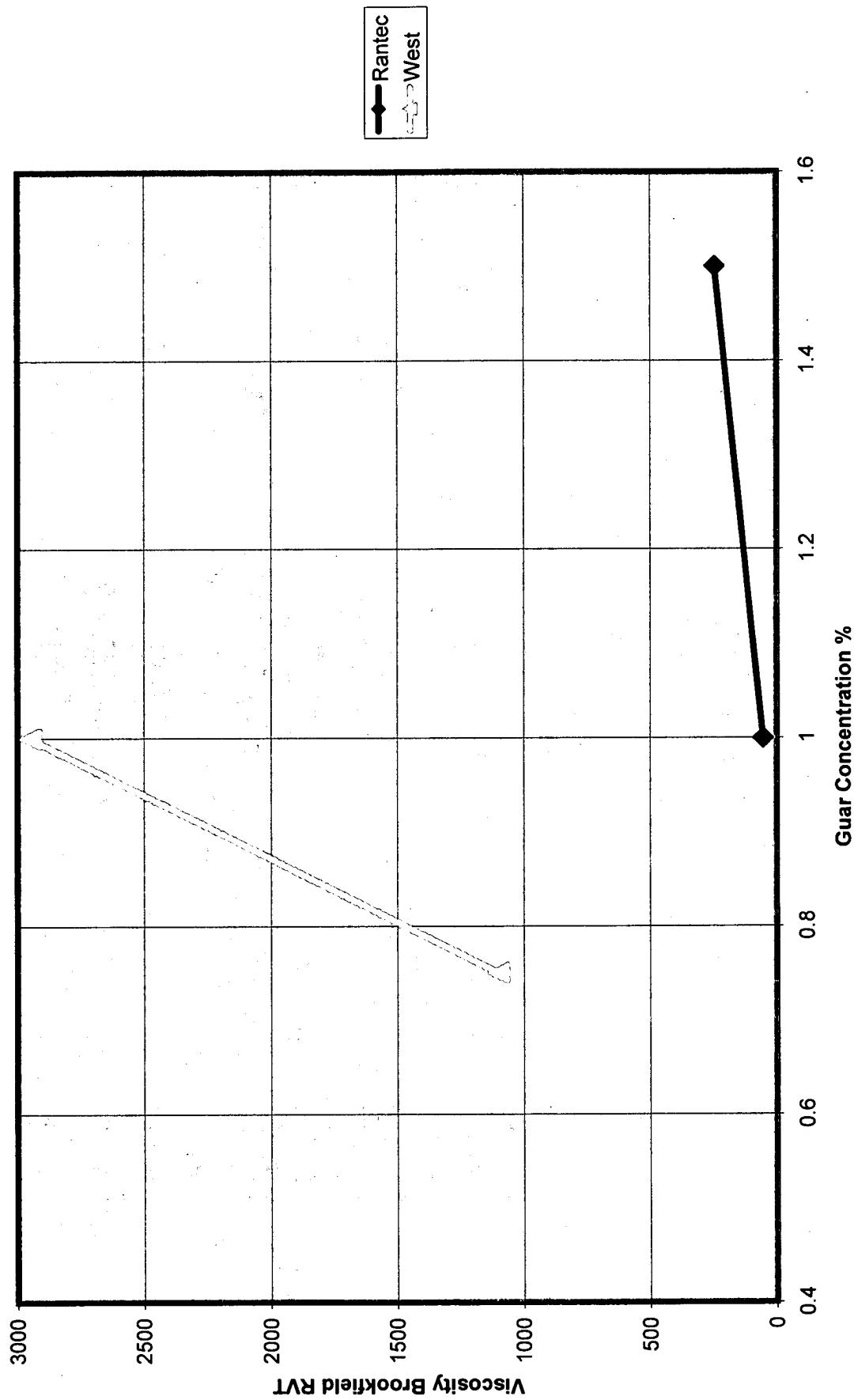
## TEST INFORMATION

4820

SAMPLE	MODEL	SPINDLE	R.P.M.	DIAL READING	FACTOR	VISCOSEITY CPS.	TEMP. °C	TIME	1005	NOTES	1007
Brkfld	1	12	23.1	26.0	5	155	80.0	5'	1010		1012.
			48.0	49.3		200	246.5	15'	1020		1022
			57.5	54.9		87.5	245	30'	1035		1037
			51.9	49.2		245	246.0	1h	1105		1107
			42.4	35.4		212.0	171.0	2h	1205		1207
			—	—		—	—	4h	205		207
			—	2.7		—	135	24h			
NL			300	25.0	24.5	1	25.0	24.5	5'		
Baroid			100	5.0	4.5	3	15.0	43.5			
			300	30.5	31.0	1	30.5	31.0	15'		
			100	18.0	18.0	3	54.0	54.0			
			300	31.0	31.0	1	31.0	31.0	30'		
			100	18.6	18.5	3	55.5	55.5			
			600	45.0	45.5	.5	22.5	22.5	1h		
			300	33.0	33.0	1	33.0	33.0			
			100	20.0	20.0	3	60.0	60.0			
			300	33.0	32.5	1	33.0	32.5	2h		
			100	20.0	19.0	3	60.0	59.0			
			300	—	—	1	—	—	4h		
CONCLUSIONS:			100	—	—	3	—	—			
			300	—	13.5	1	—	—	13.5		24h
			100	—	6.5	3	—	9.5			

## **ATTACHMENT “B”**

### Viscosity vs Concentration



Viscosity Comparison

Rantec -- West

Compound	ID	Date	Guar Concentration	Viscosity - 15 min		Guar Type
				Brookfield	RVT 20 rpm	
West	IG150	15-Apr-03	0.75			1020 J3000
West	IG214	12-Oct-05		1		2950 J3000
West	IG207	11-Oct-05		0.75		1100 J3000
Rantec	IG209	11-Oct-05		1		55 Guardian
Rantec	IG210	11-Oct-05		1.5		245 Guardian

# INSOLUBLE FILM TESTS

BY Gary

TEST ID # TG150

DATE 4/15/03

## POLYMER:

MANUFACTURER:	HGL
TYPE:	53000
RT #	
%	0.75
GRAMS	3.75

## CROSSLINKER:

MANUFACTURER:	BASF
TYPE:	Dmou
RT#	
%	
GRAMS	0.38

## OTHER ADDITIVES:

%	Ammonium Sulfate	0.25 GM
GRAMS	0.00625	

## WATER:

TYPE	Distilled
AMOUNT	500 ML

TIME POLYMER ADDED 7:26  
 MIX 2 MINUTES 7:28  
 AGE 15 MINUTES IN WATER BATH 7:41  
 TAKE 15 MINUTE VISCOSITY:  
 RVT 20 rpm 2 FACTOR 2.0  
 SPINDLE # 2  
 READING 51

VISCOSITY (CPS) 1020

CAST FILM RATE LB/ACRE DISH USED Aluminum Pan

GMS FLUID PER DISH

RESULTS AFTER AIR DRYING:

Add entire batch to pan

Fires after under water

Quality B

Control

COMMENTS: % 3.75 6m  
 ① J3000 86 0.38 } Day Bceno  
 Dmou 8.6  
 Am. Sul 5.4 0.23 }  
 4.36

② Viscosity at 15 min. 24 check pH 6.66  
 ③ Add 26.9 gm Fibrex, mix  
 ④ Check pH  
 pH 6.42

# INSOLUBLE FILM TESTS

BY Lwm

TEST ID # IG207  
TO MATCH IG150

DATE 11 Oct 05

## POLYMER:

MANUFACTURER:	<u>HGC</u>
TYPE:	<u>J3000</u>
RT#	
%	<u>0.75</u>
GRAMS	<u>3.75</u>

## CROSSLINKER:

MANUFACTURER:	<u>ASF</u>
TYPE:	<u>Dmou</u>
RT#	
%	
GRAMS	<u>0.38</u>

## OTHER ADDITIVES:

%	<u>Ammonium Sulfate</u>
GRAMS	<u>0.236</u>

TIME POLYMER ADDED 9:35

MIX 2 MINUTES

AGE 15 MINUTES IN WATER BATH

TAKE 15 MINUTE VISCOSITY: 9:50

RV 20 rpm

SPINDLE # 3 FACTOR 50

READING 22

VISCOSITY (CPS) 1100

CAST FILM 1 RATE LB/ACRE 100 DISH USED

GMS FLUID PER DISH

RESULTS AFTER AIR DRYING:

COMMENTS: Average Dey Mat'l.  
J3000 3.75  
Dmou 0.6 0.38  
Am.Sec. 5.4 0.23  
  4.36

# INSOLUBLE FILM TESTS

BY Lewm TEST ID # I6 209 DATE 11 Oct 05

POLYMER:	
MANUFACTURER:	PanJec
TYPE:	Quatran D3347
RT #	
%	1.0
GRAMS	5.0

CROSSLINKER:	
MANUFACTURER:	PanJec
TYPE:	XL
RT#	
%	
GRAMS	2.0

OTHER ADDITIVES:	
%	
GRAMS	

WATER:	
TYPE	Distilled
AMOUNT	500 ML

COMMENTS:  
*Hold XL Fast*

TIME POLYMER ADDED 9:59  
MIX 2 MINUTES  
AGE 15 MINUTES IN WATER BATH  
TAKE 15 MINUTE VISCOSITY: 9.14  
RVT 20 rpm  
SPINDLE # 1 FACTOR 5  
READING 11  
VISCOSITY (CPS) 55

CAST FILM	RATE LB/ACRE	DISH USED	GMS FLUID PER DISH
RESULTS AFTER AIR DRYING:			

# INSOLUBLE FILM TESTS

BY lwm

TEST ID # TG210

DATE 11 Oct 05

POLYMER:	
MANUFACTURER:	<u>France</u>
TYPE:	<u>Guar Gum D3342</u>
RT #	
%	<u>1.5</u>
GRAMS	<u>7.5</u>

CROSSLINKER:	
MANUFACTURER:	<u>France</u>
TYPE:	<u>XL</u>
RT#	
%	
GRAMS	<u>3.0</u>

OTHER ADDITIVES:	
%	
GRAMS	

WATER:	
TYPE	Distilled
AMOUNT	500 ML

TIME POLYMER ADDED	<u>10:16</u>	COMMENTS: <u>XL Add First</u>
MIX 2 MINUTES		
AGE 15 MINUTES IN WATER BATH		
TAKE 15 MINUTE VISCOSITY:	<u>10:31</u>	
SPINDLE #	<u>5</u>	FACTOR <u>5</u>
READING	<u>49</u>	
VISCOSITY (CPS)	<u>245</u>	
CAST FILM	RATE LB/ACRE	DISH USED
RESULTS AFTER AIR DRYING:		GMS FLUID PER DISH

# INSOLUBLE FILM TESTS

BY LWM

TEST ID # I6 214

DATE 2 Oct 85

## POLYMER:

MANUFACTURER:	<u>AGC</u>
TYPE:	<u>J3200</u>
RT #	
%	<u>1.0</u>
GRAMS	<u>5.0</u>

## CROSSLINKER:

MANUFACTURER:	<u>BASF</u>
TYPE:	<u>Dow</u>
RT#	
%	
GRAMS	<u>0.5</u>

## OTHER ADDITIVES:

%	<u>Ammonium Sulfate</u>
GRAMS	

## WATER:

TYPE	<u>Distilled</u>
AMOUNT	<u>500 ML</u>

TIME POLYMER ADDED 4:35

MIX 2 MINUTES

AGE 15 MINUTES IN WATER BATH

TAKE 15 MINUTE VISCOSITY: 14:50

RVT 20 rpm

SPINDLE # 3 FACTOR 50

READING 59

VISCOSITY (CPS) 2950

## COMMENTS:

<u>S3000</u>	<u>86</u>	<u>60</u>
<u>Dow</u>	<u>8.6</u>	<u>0.5</u>
<u>Am.Sul</u>	<u>5.4</u>	<u>0.314</u>

581

CAST FILM 1 RATE LB/ACRE

DISH USED

GMS FLUID PER DISH

RESULTS AFTER AIR DRYING:

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